COMPARISON OF YOUNG AND ADULT DRIVER CRASHES IN ALASKA USING LINKED TRAFFIC CRASH AND HOSPITAL DATA

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ABSTRACT

This report describes the most serious young driver crashes in Alaska for the period 1991 through 1995. Rates, characteristics, and medical and financial out-comes of young driver crashes are compared with that of adult driver crashes. This research project demonstrates the usefulness of data linkage in crash research. Using the Mini Crash Outcome Data Evaluation System (MINICODES), trauma registry hospital discharge data were linked with traffic crash records. The data were analyzed to compare drivers aged 16-20 with drivers aged 21-50 who were involved in a crash resulting in the hospitalization or death of a crash victim. The CrashCost Program was used to estimate costs associated with young driver crashes for the five years.

Young drivers were 2.9 times more likely than adult drivers to be involved in crashes that resulted in the hospitalization of a crash victim, and 2.6 times more likely to be involved in a crash involving a fatality. Human factors were recorded as contributing factors for 68.2% of the young drivers, compared with 55.5% of the adult drivers ($P<.0001$). The highest hospital charge averages were those incurred by the victims of motor-cycle crashes. Total costs associated with the young driver crashes were estimated to be over $300 million, which resulted in a cost per young licensed driver that was 3.4 times the cost per adult licensed driver.

INTRODUCTION

Motor vehicle crashes are the leading cause of death for young people in the United States aged 15 to 20 years. National statistics reveal that teen drivers are disproportionately involved in crashes. In 1995, young drivers aged 15 to 20 years comprised only 6.7% of the driving population, yet they accounted for 14% of the drivers involved in fatal crashes and 17% of the drivers in police-reported crashes. The losses these crashes represent in terms of human suffering are vast and difficult to quantify. The financial toll has been estimated at $31 billion annually (l).

There are a number of factors that impact the driving performances of teens including age, inexperience, supervised driving, and night driving. An examination of the effects of the different state laws on 15-17 year old driver fatality rates found that the minimum legal driving age and curfew laws had the greatest impact on driver fatality rates (2). Delayed full licensure age, night driving curfews, and supervised driving have all been shown to be effective in mitigating the high crash rate among 16 year olds. In upstate New York, however, where a combination of these strategies are employed, crash involvement rates remained low through age 24, com-pared with the other northeastern states studied (3).

The National Highway Traffic Safety Administration (NHTSA) recommends that states adopt a graduated licensing system that combines delayed full-privilege licensure, supervised driving, and night driving curfews. An evaluation of the effectiveness of New Zealand's graduated licensing system, in place since 1987, reveals a 23% reduction in crash injuries for the 15 to 19 year old population (4). Eleven states now have some form of graduated licensing. Evaluations of graduated licensing in California, Maryland, and Oregon demonstrated a 5-16% reduction in young driver crashes (5).

Motor vehicle crashes are the leading cause of death for Alaskans aged 16 through 20 and cause almost 50% of the unintentional injury deaths for this age group. Drivers in this age range were involved in 13.1% of police-reported crashes in Alaska during the period 1991 through 1995 while they accounted for only 6.3% of licensed drivers in the state. The crash rate of drivers aged 16 through 20 from 1991 through 1995 was 135.9 crashes per 1,000 drivers, which was 2.4 times the crash rate of drivers aged 21 through 50 (56.9 per 1,000 drivers).

Among 16 through 20 year old drivers, the crash rate in Alaska decreased each year to age 20. The crash rate of 17 year old drivers was 24% lower than that of 16 year old drivers; the 18 year old driver crash rate was 22% lower than that of 17 year old drivers; the 19 year old driver crash rate was 21% lower than that of 18 year old drivers; and, the 20 year old driver crash rate was 12% lower than that of 19 year old drivers.

The purpose of this study is to describe the most severe young driver crashes in Alaska, between 1991 and 1995, in terms of rates, characteristics, and medical and financial outcomes; to make comparisons between youth driver crashes and adult driver crashes; and, to demonstrate the usefulness of data linkage in crash research.

METHODS

Computerized crash records from the Highway Analysis System (HAS) for 1991 through 1995 were obtained from Alaska's Department of Transportation and Public Facilities. This system contains information on motor vehicle crashes on a trafficway, either recorded by police or self-reported. Alaska law requires that any motor vehicle crash which results in death, injury, or property damage of $500 or more must be reported to the Alaska Department of Public Safety. Data include passenger demographics, type of vehicle, type of crash, contributing factors, type of injury, and body region injured. There are up to two contributing factors listed per driver involved in a crash, recorded by the enforcement officer. They fall into four main categories: human error, roadway conditions, environmental elements, and vehicle defects.

Hospital discharge data were extracted from the Alaska Trauma Registry, also for 1991 through 1995. The trauma registry is a statewide information system housed in the Alaska Department of Health and Social Services, which includes detailed data on all injury hospitalizations in the state. Alaska's trauma registry is somewhat unique in that trauma data are collected from all Alaskan acute care hospitals, of which there are 24, and are collected on all patients admitted for 24 hours or more. Data include patient demographics, ambulance service transport and treatment, hospital treatment and length of stay, diagnosis, injury severity, discharge status, charges, and payer billed.

In order to associate circumstances of crashes with corresponding injury outcomes, crash records and trauma registry records were linked using the Mini Crash Outcome Data Evaluation System (MINICODES), developed by the National Association of Governor's Highway Safety Representatives (NAGHSR) with the support of NHTSA. This software relies on a probabilistic linkage methodology which is particularly useful with data that lack identifiers or may contain incomplete or erroneous information. The methodology has been extensively tested and has demonstrated high precision matching (6).

Trauma registry records were considered for linkage by virtue of an external cause of injury code (E Code) in the range 810.0-816.9 and 819.0-819.9, motor vehicle traffic collision injury. E Codes are a coding system with-in the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), which are routinely entered into the Trauma Registry for each trauma patient. The identifiers used for linkage of the two databases were sex, age, birthdate, geographic region, and probable hospital admission date and time. Additional variables were used to review questionable matches. They consisted of vehicle type, crash type, residence city, crash city, position of injured person in vehicle, anatomical location of injury, and the injury description.

Only the most serious crashes were considered for study, i.e. those involving the hospitalization or death of a crash participant. A **hospital crash** refers to any motor vehicle traffic crash resulting in at least one victim of the crash admitted to a hospital for 24 hours or more. A **fatal crash** refers to any motor vehicle traffic crash resulting in at least one fatality. A **fatality** is defined as a death that occurs as a direct result of a motor vehicle crash within 30 days of the injury or during an acute care hospital stay if the patient was originally hospitalized within 30 days of the injury.

Through linkage of traffic crash data with trauma registry data, two populations were identified for study: drivers in crashes and victims of crashes. Drivers were divided into two groups, those aged 16 through 20 who are referred to as **young drivers**, and those aged 21 through 50, referred to as **adult drivers**. These two age groups were used for comparison to avoid the introduction of older drivers who are involved in crash patterns unique to their group. The victims of the crashes were described in terms of outcome, hospital charge payment source, and costs. The victims were also divided into two groups, those who were victims of young driver crashes and those who were victims of adult driver crashes.

Safety equipment consists of safety belts, safety belts with harnesses, child safety seats, and helmets. **Alcohol involvement** is recorded as a contributing factor on the police record if alcohol use is confirmed by a test or suspected. **Disability** is defined as the expectation that the patient will never be able to return to his or her pre-injury level of function in the judgement of the trauma registrar collecting the information from the medical record file.

Average hospital charges per crash victim were calculated using available trauma registry data. Because not all of the hospitals release this information, hospital charges are missing on about 50% of the trauma registry patients. More inclusive cost estimates were derived using the CrashCost Program obtained from NHTSA. This software program estimates the economic costs of motor vehicle crashes, including direct medical expenses, direct "other" expenses and indirect costs. The CrashCost program also accounts for unreported crashes and adjusts for locality and current economics (7).

The CrashCost estimates were based on Alaska specific data on the number of crash fatalities and the number of patients identified with an Abbreviated Injury Scale (AIS) score of four (severe injury) or five (critical injury). Injuries of an AIS of three or less are not adequately tracked by the trauma registry since only patients admitted to the hospital for one or more days are entered into the database. Therefore, the national ratio based estimates from the CrashCost Program were used to estimate the number of these less severe injuries.

RESULTS

A total of 3,158 trauma registry records were considered for linkage with traffic records, resulting in 2,183 matches, or a 69.1% matching success rate. The linked trauma registry records were compared with the unlinked records to see if the linked records were representative of the unlinked records. There were no significant differences between the groups in sex and age, however, there were significant differences relating to geographic location of crash and type of crash. The crashes among the linked trauma registry records occurred more often in the urban areas (Anchorage, Fairbanks, the Kenai Peninsula, Matanuska-Susitna Borough, and Juneau) ($p < .0001$). There was a significantly smaller percentage of Alaska Natives in this group than in the unlinked data group ($p < .0001$). The mean injury severity was greater among the linked records than among the unlinked records ($p < .05$). The linked data also included less pedestrian injuries ($p < .0001$) and more driver injuries ($p < .0001$) than the unlinked data.

Drivers

Linkage of traffic crash data with trauma registry data resulted in 2,508 drivers identified for their involvement in hospital and fatal crashes: 488 young drivers and 2,020 adult drivers. A comparison of crash involvement rates of young and adult drivers, annualized over the five-year period, is shown in Table 1. Young drivers were 2.9 times more likely to be involved in crashes that resulted in the hospitalization of a crash victim, and 2.6 times more likely to be involved in a crash involving a fatality.

Table 1.
Annualized Young and Adult Driver Involvement Rates in Hospital and Fatal Crashes, Alaska, 1991-1995

	Young Drivers (Age 16-20) N=488		Adult Drivers (Age 21-50) N=2,020		Rate Ratio
	N	Rate*	N	Rate*	
Hospital Crash Involvement	408	3.15	1,659	1.10	2.86
Fatal Crash Involvement	80	0.617	361	0.240	2.57

* Rate per 1,000 licensed drivers

The young and adult drivers in hospital and fatal crashes are compared in Table 2. The two groups of drivers were similarly distributed by sex and use of safety equipment. Hospital and fatal crashes occurred most often during the summer months (July and August) among both groups of drivers. The time of day of the crash was also similar between the two groups. Adult driver crashes that resulted in serious injury peaked in late afternoon and early evening (25.6%) and young drivers were most at risk between noon and 4 PM (23.4%).

Table 2.
Comparison of Young and Adult Drivers in Hospital and Fatal Crashes by Driver Sex, Safety Equipment Use, and Crash Time, Alaska, 1991-1995

	Young Drivers (Age 16-20) N=488		Adult Drivers (Age 21-50) N=2,020	
	N	Percent	N	Percent
Sex				
Male	324	66.4%	1,441	71.3%
Female	164	33.6%	579	28.7%
Safety Equipment Use				
Recorded	462		1,871	
Used	252	54.5%	1,053	55.9%
Not Used	210	45.5%	818	44.1%
Unrecorded	26		149	
Crash time				
Midnight-4am	90	18.4%	304	15.0%
4am-8am	36	7.4%	187	9.3%
8am-noon	48	9.8%	232	11.5%
noon-4pm	114	23.4%	403	20.0%
4pm-8pm	111	22.7%	517	25.6%
8pm-midnight	89	18.2%	377	18.7%

There are up to two contributing factors recorded in the traffic crash database for each driver in a crash. As

indicated in Table 3, the percentage of young drivers with a contributing factor due to human error, as recorded by the investigating officer, was significantly higher than that of the adult drivers (p<.0001). Conversely, there was a greater percentage of adult drivers with "no contributing factor" recorded to describe their involvement in the crash (p=.01).

Table 3.
Comparison of Young and Adult Drivers in Hospital and Fatal Crashes by Contributing Factor, Alaska, 1991-1995

	Percent of Young Drivers with the Contributing Factor N=488		Percent of Adult Drivers with the Contributing Factor N=2,020	
	N	Percent *	N	Percent *
Human	333	68.2%	1,122	55.5% **
Vehicle	22	4.5%	49	2.4%
Environ-mental	23	4.7%	75	3.7%
Roadway	41	8.4%	122	6.0%
None	78	16.0%	551	27.3%***
Unknown	7	1.4%	21	1.0%

* Up to two contributing factors per driver so that column does not equal 100%
** p < .0001
*** p = .01

The contributing factors attributed to the young and adult drivers are detailed in Table 4. "Unsafe speed," i.e. speed too fast for conditions, was recorded as a contributing factor of the crash for 29.1% of the young drivers. "Alcohol" was believed to be a factor in the crashes of almost 16%. Conversely, alcohol was recorded factor for 24.9% of the adult drivers, with unsafe speed ranking second at 19.9%.

Table 4.
Comparison of Young and Adult Drivers in Hospital or Fatal Crashes by Contributing Factor, Alaska, 1991-1995

	Percent of Young Drivers with the Contributing Factor N=488		Percent of Adult Drivers with the Contributing Factor N=2,020	
	N	Percent*	N	Percent*
Unsafe Speed	142	29.1%	401	19.9%**
Alcohol	76	15.6%	502	24.9%***
Driver Inattention	59	12.1%	142	7.0%
Failure to Yield	45	9.2%	144	7.1%
Driver Inexperience	36	7.4%	28	1.4%
Pavement Slippery	32	6.6%	107	5.3%
Improper Lane Usage/Passing	27	5.5%	76	3.8%
Traffic Control Devise Disregard	24	4.9%	79	3.9%
Other Human Factor	19	3.9%	81	4.0%
Turning Improperly	10	2.0%	35	1.7%
Fell Asleep	9	1.8%	42	2.1%
View Obstructed	8	1.6%	36	1.8%

* Up to two contributing factors per driver so that column does not equal 100%
** p = .04
*** p = .04

Victims

Table 5 describes the outcomes of the two crash victim groups. There was no significant difference between the victims of the young driver crashes and those of the adult driver crashes in injury severity or length of hospital stay.

Table 5.
Outcomes of Young and Adult Driver Crashes, Alaska, 1991-1995

	Young Driver Crash Victims N=584		Adult Driver Crash Victims N=1,894	
	N		N	
Total Deaths	99		344	
Scene Deaths	67		228	
Hospital Deaths	32		116	
Hospitalizations	517		1,666	
	Mean		Mean	
Injury Severity Score *	10.8		11	
Length of Hospital Stay (days)	6.7		7.6	
	N	Percent	N	Percent
Head Injury	208	40.2%	628	37.7%
Chest Injury	116	22.4%	402	24.1%
Spinal Cord Injury	14	2.7%	43	2.6%
Discharged with Disability	70	13.5%	186	11.2%

* Injury Severity Score is on a scale from 1 to 75, with 75 the most severe. An ISS of 16 or greater defines major trauma.

Average hospital charges for both groups of victims are listed in Table 6. These figures are based on available cost data from the trauma registry. Included are charges by type of vehicle, contributing factor, and use of helmets and safety belts. There were no significant differences between the two groups at the 95% confidence level in any of the categories compared. The highest average charges were those associated with motorcycle crash patients. The average charge for hospitalization for non-helmeted victims of young driver crashes was twice that of the helmeted victims.

Table 6.
Hospital Charges of Young and Adult Driver Crashes by Vehicle Type, Contributing Factor and Safety Equipment Use, Alaska, 1991-1995

	Young Driver Crash Victims, N=517		Adult Driver Crash Victims, N=1,666	
	Mean	Standard Error	Mean	Standard Error
All	$16,269	$ 1,640	$18,174	$ 1,146
Vehicle Type				
Passenger Car	$15,250	$ 1,889	$17,397	$ 1,450
Motorcycle	$27,354	$ 8,344	$30,148	$ 6,279
Pick-Up Truck	$18,482	$ 5,653	$15,599	$ 1,748
Contributing Factor				
Unsafe Speed	$14,344	$ 2,575	$22,778	$ 2,511
Alcohol Use	$19,426	$ 5,614	$18,911	$ 2,184
Driver Inattention	$17,129	$ 4,452	$15,504	$ 2,848
Failure to Yield	$10,201	$ 2,294	$19,062	$ 2,797
Safety Equipment Use				
Safety Equipment Used	$15,543	$ 2,223	$15,943	$ 1,514
Safety Belt	$15,220	$ 2,547	$14,355	$ 1,176
Motorcycle Helmet	$17,309	$ 3,699	$28,323	$ 9,519
No Safety Equipment Used	$17,087	$ 2,512	$19,599	$ 1,774

No Safety Belt	$14,259	$ 2,420	$19,518	$ 2,505
No Helmet	$34,640	$19,672	$28,407	$ 7,029

The distribution of payers billed for hospital expenses associated with the 2,183 hospitalized victims are presented in Table 7. Of the patients involved in the young driver crashes, the largest percentage billed their hospital expenses to private health insurance (33.1%), followed by those who were uninsured (19.3%), and those covered by automotive insurance (14.7%).

Table 7.
Payers Billed for Hospitalization of Victims of Young Driver and Adult Driver Crashes, Alaska, 1991-1995

	Young Driver Crash Victims N=517		Adult Driver Crash Victims N=1,666	
	N	Percent	N	Percent
Private	171	33.1%	472	28.3%
Uninsured	100	19.3%	368	22.1%
Automotive	76	14.7%	225	13.5%
Indian Health Service	50	9.7%	174	10.4%
Medicaid	40	7.7%	110	6.6%
Military	24	4.6%	118	7.1%
Champus	12	2.3%	42	2.5%
Medicare	10	1.9%	48	2.9%
Other/Unknown	34	6.6%	109	6.6%

Table 8 gives estimates of the total costs associated with young and adult driver crashes in Alaska for the five years using the CrashCost Program. Cost per young licensed driver was 3.4 times the cost per adult licensed driver.

Table 8.
Cost Estimates for Young and Adult Driver Crashes, Alaska, 1991-1995 *

	Young Driver Crashes	Adult Driver Crashes
	N	N
Fatalities	99	344
Injuries **	7,648	26,569
Property Damage Only	34,333	119,248
	Cost	Cost
Direct Medical Costs	$ 36,750,837	$126,786,020
Direct Other Costs	$134,898,306	$468,099,927
Indirect Costs	$131,086,293	$454,729,271
Total	$302,735,436	$1,049,615,218
Cost per Licensed Driver	$2,336	$697

* Cost estimates based on NHTSA CrashCost Program
** Injuries include hospitalized and non-hospitalized

DISCUSSION

Alaska is similar to the rest of the nation in that young people are disproportionately involved in motor vehicle crashes, and crash injuries constitute a major health problem among this group. Alaska is, however, distinctive by having the lowest population density of any state, about one person per square mile. There are 13,485 miles of roads but only five of Alaska's urban centers are connected by road. The formidable terrain, isolation, and extreme weather conditions make access to medical care a challenge for residents and visitors alike who are involved in motor vehicle traffic crashes. Teen drivers demonstrated a greater propensity for involvement in the most severe crashes compared with adults, but the involvement rate did not increase significantly with injury severity.

The serious and fatal crashes involving young drivers were more likely attributed to human factors compared with crashes involving adult drivers. These data suggest that immaturity, inexperience and risk-taking behaviors contribute to young driver crashes.

The high percentage of safety belt and helmet nonuse among both of the study populations (44%-46%) is partially explained by the fact that these were the drivers in crashes resulting in the most serious injuries, including injuries to themselves. The Youth Risk Behavior Survey of 1995 reported that about 20% of Alaska high school students surveyed responded that they rarely or never use safety belts. Among those who ride motorcycles, about 40% rarely or never wear helmets (8). In response to the 1995 Alaska Behavioral Risk Factor Survey, 33.1% of adults reported that they did not always use safety belts

(9). These percentages are all higher than comparable national percentages. Lap and shoulder belts are 40-50% effective in reducing deaths and 45-55% effective in preventing moderate-to-critical injuries to passenger vehicle occupants (10). NHTSA estimates that helmets are 29% effective in preventing fatal injuries to motorcyclists and in a recent study showed that motorcycle helmets are 67% effective in preventing brain injuries (11).

Alcohol was not the leading contributing factor in young driver crashes as it was for adult driver crashes. This has been reported by other researchers and can be attributed largely to an alcohol purchase age of 21 in all states and a zero tolerance law for drivers under the age of 21 in 30 states, including Alaska. Zero tolerance means that anyone with a BAC level above 0.02 g/dl is considered legally intoxicated (1, 12, 13).

Almost 50% of hospitalized victims of teen driver crashes relied on private or automotive insurance to pay their hospital expenses. One hundred victims, or 19.3%, were uninsured. The hospital charges of an additional 26.3% of the patients were billed to a government program. NHTSA estimates that nationally private insurance companies pay 55% of medical costs for hospitalized patients of motor vehicle crashes and the government pays only 23% (14). Alaska has a large Native American population and several military bases, which contribute to a significant role of the federal government in covering the cost of medical care in the state.

The highest average costs of hospitalization were incurred by motorcycle crash victims. Unhelmeted crash patients topped the list with an average cost of over $34,000, double that of the helmeted victims in the same group.

Using the CrashCost Program, the estimated costs for teen driver crashes in Alaska for five years was over $300 million. The financial burden quickly becomes an issue of public policy when such a large percentage of the cost is reimbursed with public funds.

There were several limitations to this study. Every driver in a crash was included in the crash involvement rates. Multiple car crashes involving more than one driver added multiple drivers to the statistics, often into both age groups simultaneously. In reality, driver responsibility for crashes is more complex than that, with participants assuming varying degrees of fault. For the purpose of this study, however, driver responsibility was given equal weight and was based on involvement.

Missing and incorrect data is undoubtedly partly responsible for the inability to link all trauma registry records with traffic crash records. The error rate in data linkage due to the linkage process itself has not been quantified. It is believed, however, that the 31% in non-linked data was largely due to unreported traffic crashes. A comparison of hospital discharge files and police road injury data in Australia resulted in a linkage rate of 64%. The researchers found increased linkage with injury severity and varying linkage rates with different types of crashes (29% for motorcyclists vs. 79% for motor vehicle drivers.) They also noted that the casualties outside the urban area linked less often to a police report than the urban casualties. Their conclusion was that the low linkage rate was largely due to the underreporting of crashes by police (15).

An under reporting of pedestrian injuries was reported by Agran, Castillo and Winn in 1987, in a comparison of police report information with hospital monitoring system information in Orange County, California. It was estimated that police underreported pedestrian injuries by 20%. The researchers also noted that nontraffic incidents were especially underreported, mainly because the police database criteria excludes cases occurring on private property (driveways, sidewalks and parking lots) where a large percentage of pedestrian injuries occur (16). Similarly, Alaska's traffic crash data reporting system excludes incidents on private property, as well as those involving vehicles not customarily used for transport on roads.

Other possible reasons for the under reporting of traffic crashes include lack of police officers in the rural areas, reluctance of crash participants to notify police, and failure of local enforcement personnel to submit investigation forms to the Department of Public Safety.

The mean age of the injured victims of young driver crashes was slightly lower than that of the entire population of injured victims studied (25 vs. 30). Since the CrashCost estimates were based on national averages, the present discounted value of lost productivity for victims of young driver crashes would differ slightly from the value of lost productivity for victims of all crashes. The difference, however, is likely to be minor.

RECOMMENDATIONS

The factors contributing to Alaska's young driver crashes -- youth, inexperience, and risk-taking behavior -- are analogous to those seen in other states and countries. Currently there is no graduated licensing system in Alaska; however, legislation has been introduced and is currently under consideration during the 1997-98 legislative session. Alaska is also one of few states that does not require any instructional permit prior to obtaining a full privilege license. Graduated licensing has been shown to successfully reduce young driver crashes. It is recommended that Alaska adopt a graduated licensing system that is appropriate for Alaskans, to include the requirement of supervised driving under an instructional permit, a probational driving period, and raising the minimum age for full licensure to 17. The expected result would be a reduction in injuries and deaths, mitigation of the impact of crashes on Alaska's stretched emergency medical services, and a significant cost savings.

Alaska has a primary safety belt enforcement law for children under age 16 and secondary enforcement for those aged 16 and over. There is a helmet law for motorcyclists under age 18 and all motorcycle passengers. At the least, the primary safety belt law and the helmet law should be expanded to include young drivers through age 20 to protect those drivers at greatest risk. Even more effective are universal laws, i.e. mandated usage for all persons, which have been shown to increase belt usage 10-15% and helmet usage to 100% (10,11).

In the past three years Alaska has enacted two zero tolerance laws for young people under 21 years of age. A minor caught in possession of or consuming alcohol, regardless of motor vehicle involvement, can have his or her driver's license revoked. A minor also can be cited for "driving while intoxicated," for any level of alcohol registered on a breathalyzer test. These laws send an important message to young drivers about drinking and driving in a state that has a major problem with alcohol involvement relative to a great variety of injuries. Full commitment by state and local jurisdictions is needed to enforce these and all other traffic safety laws.

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